

Memorandum

To: Wells, Rocky Reach, and Rock Island HCPs Hatchery
Committees and Priest Rapids Coordinating
Committee Hatchery Subcommittee Date: February 19, 2020

From: Tracy Hillman, HCP Hatchery Committees Chairman and PRCC Hatchery Subcommittee
Facilitator

cc: Larissa Rohrbach, Anchor QEA, LLC

**Re: Final Minutes of the January 15, 2019 HCP Hatchery Committees and PRCC Hatchery
Subcommittee Meetings**

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees (HCs) and Priest Rapids Coordinating Committee Hatchery Subcommittee (PRCC HSC) meetings were held in Wenatchee, Washington, on Wednesday, January 15, 2020, from 10:00 a.m. to 3:00 p.m. Attendees are listed in Attachment A to these meeting minutes.

Action Item Summary

Joint HCP-HCs and PRCC HSC

- Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) to present pre-spawn mortality modeling results for spring Chinook salmon at an upcoming HCP-HC meeting (Item I-B). *(Note: this item is ongoing.)*
- Kirk Truscott will discuss with Colville Confederated Tribes (CCT) biologists whether elemental signature analysis could differentiate natural-origin Okanogan spring Chinook salmon from other natural-origin Chinook salmon during broodstock collection at Wells Hatchery for Methow Fish Hatchery programs (Item I-B). *(Note: this item is ongoing.)*
- Brett Farman will discuss with Charlene Hurst and Mike Tonseth the potential use of a multi-population model for estimating proportionate natural influence (PNI) for the Nason and Chiwawa spring Chinook salmon programs (Item I-B). *(Note: this item is ongoing.)*
- Greg Mackey will work with Mike Tonseth to test a modeling approach and prepare a white paper on the method for determining a range for the number of females to be collected for a given broodstock in the upcoming year (Item I-B). *(Note this item is ongoing.)*
- Greg Mackey will prepare a plan for alternative mating strategies based on findings described in his previously distributed literature review (Item I-B). *(Note this item is ongoing.)*
- Mike Tonseth will confirm the completion date for an updated plan for Outplanting Surplus Methow Composite Spring Chinook (Item I-B). *(Note this item is ongoing.)*

- Greg Mackey and Mike Tonseth will provide edits to the draft 2020 Broodstock Collection Protocols to Larissa Rohrbach by Friday, January 31, 2020, for compilation and distribution to the HCP-HCs and PRCC HSC no later than Friday, February 7, 2020 (Item III-B).
- Keely Murdoch will provide Appendix K to the 2020 Broodstock Collection Protocols to Larissa Rohrbach for compilation when it is complete (Item III-B).
- Tracy Hillman will append the 2018 guidance from the panel of agency geneticists to the PUDs' Monitoring and Evaluation (M&E) Plan (2019 Update) for distribution (Item III-C).

Rock Island and Rocky Reach HCs

- Mike Tonseth and Catherine Willard will update the Broodstock Collection Protocols with the proposed plan for collecting Chiwawa spring Chinook salmon broodstock at Tumwater Dam and the Chiwawa Weir in 2020 (Item III-A).
- Mike Tonseth and Catherine Willard will update the Broodstock Collection Protocols with the proposed plan for collecting Chelan Falls summer/fall Chinook salmon broodstock at Wells Hatchery and in the Chelan River in 2020 (Item IV-A).

PRCC HSC

- Craig Busack (National Marine Fisheries Service [NMFS]) will provide written responses to the PRCC HSC's questions on White River spring Chinook salmon hatchery production (Item II-B).

Decision Summary

- The Wells HC approved Douglas County PUD's *Implementation of Comprehensive Monitoring and Evaluation of Wells Hatchery Complex Programs in 2020* via email and phone on December 24, 2019.

Agreements

- The HCP-HCs and PRCC HSC agreed to update the PUDs' M&E Plan (2019 Update) by appending the written guidance from the panel of agency geneticists developed in 2018.

Review Items

- There are no items available for review.

Finalized Documents

- The Wells Complex summer steelhead Section 10(a)(1)(A) permit and the PUDs' unlisted summer/fall and fall Chinook salmon bundle Section 10(a)(1)(B) permits were finalized and signed by all parties in September and October 2019, expiring December 31, 2029.

- The Wells HC-approved *Implementation of Comprehensive Monitoring and Evaluation of Wells Hatchery Complex Programs in 2020* was distributed by Larissa Rohrbach via email to the HCP-HCs and PRCC HSC on Monday January 1, 2020.

I. Welcome

A. Routine Safety Briefing

Grant PUD staff provided a routine safety briefing on emergency procedures for the meeting location.

B. Review Agenda, Announcements, Approve the November 20, 2019 Meeting Minutes, Review Last Meeting Action Items

Tracy Hillman welcomed the HCP-HCs and PRCC HSC to the meeting. Hillman reviewed the agenda and asked for any additions or changes to the agenda.

Hillman moved the PRCC HSC discussion on White River spring Chinook salmon to the top of the agenda allowing guest attendee Craig Busack to answer members' questions on NMFS' view of hatchery supplementation in the subbasin. The HCP-HCs and PRCC HSC members approved the revised agenda.

Several announcements were made.

- Keely Murdoch announced that David Blodgett III will replace Steve Parker, who has retired, as the Yakama Nation's (YN's) representative to the Policy Committee.
- Hillman announced that an assessment of survival estimates that are based on wild, passive integrated transponder (PIT)-tagged fish has been written for Upper Columbia populations as a chapter in the annual Comparative Survival Study report.¹ Hillman will distribute the relevant chapter to the HCP-HCs and PRCC HSC.
- Hillman shared highlights from a presentation by Laurie Weitkamp on recent ocean conditions and National Oceanic and Atmospheric Administration (NOAA) Fisheries' most recent report on "Ocean ecosystem indicators of salmon marine survival in the Northern California Current."² Conditions continued to be poor for salmon survival in 2019. Relatively warm ocean conditions have occurred since 2014; the biological responses have been huge and are likely to continue

¹ Fish Passage Center 2019. Comparative Survival Study of PIT-tagged Spring/Summer/Fall Chinook, Summer Steelhead, and Sockeye. 2019 Annual Report. Prepared by the Comparative Survival Study Oversight Committee and Fish Passage Center. December 2019. Available at: <http://www.fpc.org/documents/CSS.html>.

² NOAA Fisheries. Outlook of adult returns for coho and Chinook Salmon. Available at: <https://www.nwfsc.noaa.gov/research/divisions/fe/estuarine/oeip/g-forecast.cfm#TableSF-02>.

for several years. Hillman said the presentation will be given at the Upper Columbia Science Conference taking place next week, January 22 and 23, 2019.

The HCP-HCs and PRCC HSC representatives reviewed the revised November 20, 2019 meeting minutes. The HCP-HCs and PRCC HSC members approved the meeting minutes as revised.

Action items from the HCP-HCs and PRCC HSC meeting on November 20, 2019, were reviewed, and follow-up discussions were addressed (*note that italicized text below corresponds to agenda items from the meetings on November 20, 2019*):

Joint HCP-HCs and PRCC HSC

- *Mike Tonseth will coordinate with Andrew Murdoch (Washington Department of Fish and Wildlife [WDFW]) to present pre-spawn mortality modeling results for spring Chinook salmon at an upcoming HCP-HC meeting (Item I-A).*

Tonseth said pre-spawn mortality values will be available soon. This information will inform the Wenatchee Spring Chinook Management Plan and the sliding scale currently used to determine the size of the Nason and Chiwawa conservation programs. This item is ongoing.

- *Kirk Truscott will discuss with Colville Confederated Tribes (CCT) biologists whether elemental signature analysis could differentiate natural-origin Okanogan spring Chinook salmon from other natural-origin Chinook salmon during broodstock collection at Wells Hatchery for Methow Fish Hatchery programs (Item I-A).*

Truscott said he is making progress and may have something available for distribution over email within the month. This item is ongoing (Item I-A).

- *Brett Farman will discuss with Charlene Hurst and Mike Tonseth the potential use of a multi-population model for estimating proportionate natural influence (PNI) for the Nason and Chiwawa spring Chinook salmon programs (Item I-A).*

Tonseth said he needs to provide Farman with the necessary data. This item is ongoing.

- *Greg Mackey will work with Mike Tonseth to test a modeling approach and prepare a white paper on the method for determining a range for the number of females to be collected for a given broodstock in the upcoming year (Item I-A).*

Mackey said this item is ongoing.

- *Greg Mackey will prepare a plan for alternative mating strategies based on findings described in his previously distributed literature review (Item I-A).*

Mackey said he has written a plan for Wells summer Chinook salmon and Methow spring Chinook salmon. A response was provided on the spring Chinook salmon plan from Charlie Snow's office and Mackey is awaiting a response on the summer Chinook salmon plan. This item is ongoing.

- *Mike Tonseth will confirm the completion date for an updated plan for Outplanting Surplus Methow Composite Spring Chinook salmon (Item II-A).*

Tonseth said he is currently reviewing a draft and that he is conferring with NMFS about additional questions that arose. Tonseth said he has no completion date yet. This item is ongoing.

Wells Hatchery Committee

- Keely Murdoch will contact Melinda Goudy (YN) to determine if there is capacity to transfer surplus summer/fall Chinook salmon eggs to the Yakima Basin programs (Item III-A).
Murdoch said there was no capacity to accept eggs in the Yakima Basin. No eggs were transferred. This item is complete.

PRCC HSC

- Todd Pearsons will revise the 2020 Broodstock Collection Protocols to pilot test collecting natural-origin Priest Rapids Hatchery fall Chinook salmon in the Angler Broodstock Collection fishery.
This item is complete.

II. PRCC HSC

A. Approve the November 20, 2019 Meeting Minutes, Committee Updates, and Meeting Summary Review (Todd Pearsons)

The PRCC HSC representatives approved the November 20, 2019 meeting minutes as revised.

Tracy Hillman reviewed the agenda. He explained that the intent of the agenda item on White River spring Chinook salmon recovery was to identify questions for Craig Busack. Busack was formerly the NMFS representative on the PRCC HSC and was involved in early discussions regarding White River spring Chinook salmon supplementation. Busack's responses to the questions will support decision-making on a White River spring Chinook salmon hatchery program.

B. White River Spring Chinook Salmon

Tracy Hillman welcomed Craig Busack who joined the meeting by phone with Brett Farman. Busack said he and Farman had conferred on the questions that were posed by the PRCC HSC and emailed to Busack on December 9, 2019. Busack said he flagged some of the questions for discussion with higher levels of authority and confirmed some answers with Mike Ford (NMFS). Hillman asked Busack to discuss his answers with the PRCC HSC in today's meeting and to provide his written responses via

email following the meeting for clarity. The following are minutes of the discussion that occurred during the meeting.

1. Is the White River spawning aggregate necessary to the Wenatchee spring Chinook salmon population in regards to meeting viable salmon population (VSP) criteria?

Busack said the short answer is no, but it would help. Busack said, the long answer requires more research on past discussions and written statements involving NMFS. WDFW considered the White River spring Chinook salmon a separate population in the past, then NMFS reconsidered its importance to diversity. Busack said meeting the VSP criteria (abundance, productivity, spatial structure, and diversity), depends on considering each in context with all the others. Meeting the diversity criteria is not absolutely necessary if other criteria are met, but meeting the diversity criteria would be a good thing. Busack relayed a statement by Ford who said if the environment is distinctive enough to create a locally adapted aggregate in the White River, it will probably arise again if conditions are correct.

Kirk Truscott asked if the loss of White River spring Chinook salmon would reduce diversity and spatial structure that would need to be replaced by another spawning aggregate. Busack said he reviewed the Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (UCSRB 2007; Recovery Plan),³ which states that natural spring Chinook salmon spawning will occur in four out of five major spawning areas (MSAs) and in one minor spawning area (mSA). By these criteria, the White River aggregate is not essential for recovery. Busack said the standard that has to be met for production is relatively low. According to the Recovery Plan, the minimum number of naturally produced spring Chinook salmon redds within each MSA will be either 5% of the total number of redds within the Wenatchee subbasin or at least 20 redds within each major area, whichever is greater. Todd Pearsons said some people think the Upper Wenatchee River is not a viable MSA because it appears to be more of a sink than a sustainable spawning population. If the Upper Wenatchee River MSA is lost, should the Recovery Plan drop down to maintaining three of four MSAs, or some other revision, and how hard is it to revise that approach and the Recovery Plan? Busack cautioned that the Recovery Plan is not a regulatory document, it is an advisory document, intended to guide actions toward meeting recovery criteria. Busack said he is unsure what the Recovery Plan revisions and discussions would require and that the NMFS personnel that helped craft the plan have retired. Busack said if the question is whether maintaining four of five MSAs is wrong because the Upper Wenatchee River is not a real MSA, then this is a larger discussion. Bill Gale said there is no magic number directing how many spawning areas a basin needs to have. When the plan was developed, five MSAs were identified in discussions; however, in other basins like the Entiat,

³ Upper Columbia Salmon Recovery Board (UCSRB) 2007. Upper Columbia Salmon and Steelhead Recovery Plan. August 2007. Available at: <https://www.ucsr.org/mdocuments-library/plans/>.

only one was identified. Gale said it should not be surprising that information from 10 years ago would prove to be different now.

Busack said if managers cannot meet this criterion, he is unable to comment on whether the White River MSA is necessary for recovery. Farman said if it is a bigger question, as in, if that population no longer exists or is not valuable, then it is not a question that can be answered in this forum and requires a broader forum with the Upper Columbia Salmon Recovery Board (UCSRB).

Busack said, for example, the Lower Columbia River/Upper Willamette River recovery standards divided the Lower Columbia ESU into three strata and separate criteria were developed for all three. The Lower Columbia Salmon Recovery Board said the criteria were infeasible for the Gorge stratum and did not necessarily agree that there was historically that level of diversity. The Lower Columbia Salmon Recovery Board came up with their own criteria that was adopted in the recovery plan for that domain, but it was a long discussion [among all stakeholders].

Busack said [reexamining the importance of the White River] changing recovery criteria would likely require a Recovery Plan revision. Busack said even though the Recovery Plan is advisory and not regulatory, when NMFS reviews a Hatchery and Genetic Monitoring Plan, they must ensure it is consistent with the Recovery Plan. Hillman said it would be difficult to initiate a process to revise the Recovery Plan. Keely Murdoch said, with proper data that indicates that goals are unobtainable or incorrect, the discussion may be feasible. Hillman said the Counties may have difficulty with reinitiating these discussions.

Peter Graf asked, to maintain a spawning aggregate, is it necessary to maintain its diversity or abundance or both? Murdoch said it is both. Graf asked if the criteria could be met with fish distributed elsewhere that carry the White River genetic signal? Hillman showed the difference between diversity and spatial structure criteria in the Recovery Plan for maintaining a spawning aggregate. Graf said the question under discussion is, "is the White River aggregate necessary?" Hillman repeated Busack's answer, "no, but it would be good."

2. What is the NOAA's Northwest Fisheries Science Center's most recent view on the importance of the White River spawning aggregate?

Busack said he spoke to Ford who referenced the most recent FST data (a measure of genetic distance) that shows a difference in FST values of 0.0025 between Nason and Chiwawa aggregates, and 0.0025 between natural and hatchery fish throughout the [Wenatchee] Basin.

The difference in Chiwawa and White River aggregate FST values is 0.00409, which is twice as large as that between other aggregates. Ford cautions these are very, very small numbers such that the difference could be the result of genetic drift and reflect genes from other historic programs [rather

than local adaptation]. Busack said though this metric shows the White River aggregate is distinct, it should be interpreted with caution. Ford wrote if habitat in the White River is distinctive, adaptation should develop there. Management decisions may be based on balancing short-term needs with long-term needs. Busack said the aggregates are genetically different but not hugely different and the analysis was done some time ago. Busack said that Ford, Shawn Narum (Columbia River Inter-Tribal Fish Commission [CRITFC] geneticist), and Ken Warheit (WDFW geneticist) were looking for outliers to show some selection signal and could not find it. Busack said the importance of the genetic diversity in the White River is uncertain.

Looking at the FST numbers, Truscott asked, should we conclude that there is no difference between hatchery-origin (HOR) and natural-origin (NOR) returns, and so the recovery should be based on total returns not just NOR? Busack said no, genetic distance that is based on neutral markers just indicates that HOR and NOR are interbreeding, but they should not be considered equivalent. Truscott said the same could be said between the Chiwawa and White aggregates that are known to interbreed and he would have expected closer FST values. Busack said genetic signature of White River aggregate will bounce around year to year due to the small number of spawners. Chiwawa and Nason aggregates are larger groups so the values of this metric would be more stable.

Busack said, as a geneticist, he avoids looking at FST values. Gale asked if the difference between Chiwawa and Nason is a negligible number. Busack said as an author of regulatory documents, he avoids using the word negligible, but there is not strong evidence for biologically meaningful differentiation here. Pearsons said he wondered if the numbers Ford was using to show differences were based on numbers collected since the last geneticist panel discussion.

Hillman asked what size FST would be considered biologically significant or meaningful. Busack said approximately 0.1, for example, based on other populations. Busack said he typically does not use FST values, but 0 indicates no difference and 1 indicates complete genetic/reproductive isolation. Gale said, for context it would be good to know the FST differences between, for instance, Chiwawa and Methow spring Chinook salmon. Busack read from a table from Todd Seamons showing that different winter steelhead in the Puget Sound have FSTs of 0.5. Farman said it is not helpful to go down the path of identifying specific FST criteria for what identifies a spawning aggregate because it may not be a target we can define. Farman said his sense is the most recent data indicate the White River MSA is still a distinct spawning aggregate and these data support what is currently in the Recovery Plan. Farman said there is not going to be an FST value chosen that would indicate that no action would be required.

Tom Scribner said he has been involved in the White River program since the inception and observed the resources spent on a major and expensive captive broodstock program. He asked if the perspective has changed today relative to the past when it was considered so important to initiate a

captive broodstock program. Busack regrets the money spent on the White River in the past. With many years of observations, more data, and shift in general views toward salmon recovery, NMFS has backed off from their original position a few years ago. Busack said given the overall challenges salmon recovery faces it is uncertain how much the status of a small spawning aggregate should be emphasized. Busack said to his knowledge, there is no other place where there has been so much focus on one population subcomponent, especially for Chinook salmon. Busack said the Upper Columbia Evolutionarily Significant Unit (ESU) is different too; there are only three extant populations to work with, which is different compared to, for instance, the Salmon River with around 25 populations to work with. Busack said ideas have evolved.

3. If the White River and Little Wenatchee spawning aggregates are important to recovery and both suffer from the same limiting factors, how will NOAA address recovery without one or both aggregates?
 - a. Can both aggregates be considered one aggregate?
 - b. Is there a need to revise the existing Recovery Plan?

Busack said It would be good to review the Recovery Plan to discern what is stated about diversity versus demography, but that he recollects that the material on diversity was not as comprehensive, thorough, and demanding as he thought it would be. There is not a discussion on what the decision would be if maintaining diversity is not working. Hillman said there is a draft of an adaptive management plan associated with the Recovery Plan that may be informative.

4. How important is the White River aggregate to the overall genetic diversity of Wenatchee spring Chinook salmon?
 - a. How much within-population genetic variation is needed for recovery?
 - b. Given the degree of escapement by other within-basin aggregates into the White River, is there evidence to suggest that the White River aggregate is still genetically distinct?

Hillman said the answers to this question are likely consistent with question 1. Busack said people assume there is a formula for reviewing the VSP metrics to measure how close an ESU is to recovery. Busack said there is no standard formula for evaluating recovery; everything has to be reviewed in the context of everything else. Busack said no ESU has been delisted yet. During delisting discussions, the first metric considered is usually natural-origin abundance. Diversity has yet to be considered as a key factor in terms of delisting.

5. If the White River genetic signature is lost, can recovery still be achieved?

Busack said yes.

- a. If so, how do we achieve recovery without the White River genetic signature?

Busack said it needs to be assured that in the Recovery Plan there are heightened levels of diversity elsewhere. Pearsons asked, hypothetically, in a worst-case scenario where White River aggregate dies out and recolonization by Chiwawa or Nason aggregates occur, how would recovery be met? If other criteria are met for recovery based on abundance, spatial structure, etc., how do you show you have met the criteria for genetic diversity?

Busack said it would be desirable to observe diversity among the spawning aggregates. Even though the White River would be recolonized, it would be desirable for enough time to pass to see genetic differences develop between aggregates. Pearsons asked what if gene flow continues as it occurs now? Busack said an aggregate does not have to be free of gene flow, but there has to be some measure of genetic divergence greater than that caused by simple genetic drift. Busack said no one has ever brought these issues to NMFS before. If an aggregate is meeting other criteria such as productivity and abundance, diversity is likely to develop on its own. Mike Tonseth said an argument could be made, if recolonization is natural over a long enough period of time and the White River environment is unique, that the diversity criteria are being met. Busack said local adaptation is hard to prove and is typically assumed. Busack said delisting is a larger process than hatchery management and outside his area of emphasis. Pearsons said its helpful to have a target in order to design programs. Busack said the target should be natural sustainability.

6. Would NOAA support a composite broodstock hatchery program for the White River?

Busack said he and Farman do not like to use the term "support" to describe their role. NMFS' role on ruling on Hatchery and Genetic Management Plans (HGMPs) is to ensure they are consistent with recovery. As long as compositing is consistent with, and not limiting recovery, NMFS would probably approve the actions, but would not be enthusiastic about it. Busack acknowledged that a broodstock program may not be possible without compositing because there are not enough White River fish to support a hatchery program there. Busack said perhaps the population is too small right now for selective forces to act on it. Busack said it is important to ask how useful compositing would be for recovery and whether it would help the program.

7. If White River spring Chinook salmon are not genetically distinct from other Wenatchee spring Chinook salmon aggregates, what would be NOAA's view on White River supplementation?

Busack said if the question is, if there is no genetic concern, then the answer is similar to question 6. Busack said, from what you have told us about the White River, it is important to ask if supplementation is really the answer.

8. If HORs do not contribute to NORs, would adding another supplementation program in the Wenatchee contribute to recovery?

Busack said we (NMFS) would like to know that the underlying population would sustain itself. Adding HORs to the spawning population temporarily creates more NOR recruits. A small population may have high genetic drift and may be inbred. Adding HORs can help by contributing to supplementation to allow selective forces to work on a population.

Pearsons asked if NMFS would assess whether that natural population is sustainable with HORs in the population, or does recovery require demonstrating that natural populations could sustain themselves without the hatcheries?

Busack said this is currently a major issue under broader discussion. That is, if HORs are successful, they are contributing to NORs but the level of their contribution is unknown. This has been an issue with Snake River fall Chinook salmon. Productivity of those fish has been better than expected, but this is in context of many hatchery fish being released. Busack said potential statistical techniques that could parse this out may be informative.

Pearsons asked, is it the interpretation that the standard for recovery would not be that all hatchery production is stopped to observe whether a population is naturally sustaining? Busack said messaging from NMFS on this topic has not been good. There is a widespread assumption that recovery cannot be achieved without turning off all the hatcheries. Busack said knowing if natural productivity has been achieved is very difficult in the context of hatchery production. Busack said NMFS would be open minded to shutting off hatchery production in some locations to make this observation if it were acceptable with stakeholders.

Pearsons asked, if there is a hatchery program that does not increase NORs, would that constitute something that would not contribute to recovery? Farman said the answer to the first part of the question is to confirm that the hatchery program is not contributing to recovery. The hatchery program may still contribute or prop up the population even if NORs do not increase.

Pearsons asked whether every permitted program action has to contribute to recovery? Busack said actions have to be consistent with the Recovery Plan but does not have to be contributing measurably to recovery, but asked if this question was about permitting or delisting? Pearsons said permitting.

Tonseth said the assumption that the hatchery is not producing NORs may be an oversimplification. Just because you do not observe the uptick in NORs does not mean the hatchery is not contributing. There could be outside forces like poor ocean conditions affecting productivity. Pearsons said if increases in NORs are not observed in other Wenatchee River watersheds, why assume it would work in the White River? Murdoch said the other element not considered here is whether there are other factors that limit natural production. It is not clear what is limiting productivity whether in freshwater, estuary, ocean, etc. Murdoch said the hatchery fish would be subject to the same limiting factors.

Murdoch said the hatchery program buys time and is helping to preserve genetic components and numbers while other limiting factors are being addressed.

Pearsons asked, if no increase in natural productivity metrics is observed, how can the value of the hatchery be assessed? Murdoch said the value is that the hatchery provides a cushion against catastrophic population failure. Pearsons said he understands that a hatchery program can buy a population time, but asked if natural productivity is not consistently found to be working across many subbasins, how can the value of hatchery programs be measured? Murdoch said this depends on definition of success of the programs. Murdoch said a hatchery program is working if it reduces risk of extinction. If whether a hatchery program is working to supplement natural productivity alone is in question, this depends on addressing the other limiting factors.

Hillman asked how would NMFS evaluate a proposed hatchery program in the White River? It seems they would determine whether it precludes recovery and is consistent with the Recovery Plan. Farman said he agrees that it would provide a buffer to failure. Hillman summarized that a hatchery program may be acceptable to NMFS if it does not preclude recovery.

Busack said the general approach to supplementation hatcheries in the Upper Columbia is a risk-aversion measure. There is some risk that they are eroding diversity through domestication though there are no hard numbers to indicate how much they do that. Right now, extinction risk is not going down due to ocean conditions.

9. If survival data indicate the bottleneck for White River spring Chinook salmon is predation (e.g., bull trout) within Lake Wenatchee, how do the federal regulatory agencies interact to resolve the issue?

Busack said he is aware of one example in the Clackamas River where work was done to increase bull trout range and the question was whether bull trout would eat Chinook salmon. Busack said the approach to working with U.S. Fish and Wildlife Service (USFWS) ranges widely depending on personnel working on the issue. His personal experience has been with bull trout consultations working with three different state offices and the approach has been different in all three. Busack said the issue is also arising when considering the relative risk of increasing hatchery fish production relative to orca extinction risk. Gale said agencies can work together on this, but the difficult discussion is to choose between two imperiled species, which is not easy. Farman said in the absence of a concrete proposal and assumptions about bull trout predation in Lake Wenatchee, it is hard to know what to consult on with USFWS. Farman said that the project proponents, and not NMFS, would need to develop a proposed action. Busack said it would be better to co-develop the action rather than for one party to propose something the other has to consult on.

Scribner thanked Busack for joining the meeting, answering questions, and for providing honest responses. Scribner said the YN Tribal Council has been very interested to hear the responses given today and he will be reporting back to them. Scribner said he is hearing a lot of vagueness and uncertainty that there is no backup plan or set path forward for recovery. Scribner said he would like to bring this back to the Tribal Council with a better path forward and with more certainty about the sideboards around the path forward. Scribner asked, how do we get to resolving some of the uncertainty around how to interpret recovery? Scribner said, for example, YN fisheries are restricted and he needs to show that there is a path forward.

Focusing on productivity in the White River, Busack said NMFS would not rule out a White River supplementation program. Scribner said it is not just the White River. He needs to understand how spawning aggregates relate to the overall recovery of the ESU. Scribner said he needs a clearer picture of what it will take to achieve a sustainable population that meets the ESU criteria.

Busack said this is a big question and advised starting a dialogue with Michael Tehan about this. Tehan is in charge of the interior Columbia basin office and questions of recovery, such as potential revisions to the Recovery Plan, should be directed to him. Busack suggested starting by talking to Dale Bambrick, who reports to Tehan. Busack said the difference between hatchery consultations and recovery has been an issue for some time. Farman said the difficult position is that NMFS is not an action agency. Farman said he is trying not to be indifferent but would not take the role of an advocate for a specific program. Farman said NMFS takes a middle role to review permits but does not advocate for certain programs. (Note that additional clarifying comments were provided by Busack via email on January 21, 2020, provided in Attachment B, and written responses to the questions provided by Busack on February 10, 2020 are provided in Attachment C. Busack noted that if any discrepancy exists between these meeting minutes, and his formal written responses, the formal responses should be considered the authoritative version.)

Busack thanked the PRCC HSC and left the meeting.

Hillman asked if there were any follow-up questions or discussion from the PRCC HSC members. Hillman summarized that Busack's responses were somewhat expected and that his answers would refer back to the Recovery Plan.

Murdoch said, as Busack described it, there is flexibility in the Recovery Plan, whether the region is willing to revisit it or not. Tonseth said he suggests initiating a discussion with the UCSRB to identify how flexible the plan really is, whether it can be updated with recent data. Murdoch said she also now realizes there may be more flexibility in how to operate a hatchery program as directed by the PRCC HSC, and NMFS would approve if consistent with the recovery plan. Gale said NMFS decides whether a population should be listed. The Board's plan is advisory because they are not the

decision-makers, and it depends on whether hatchery program actions meet Recovery Plan goals. Gale said NMFS is a regulatory agency, but that NMFS may advocate certain positions as an HCP member. Murdoch said that during HGMP development, Chris Peterson (formerly the NMFS representative on the HCP-HC and PRCC HSC) abstained from approving the Proposed Action in the HCP meetings because NMFS would later be consulting on it. Tonseth said if what is proposed is inconsistent with the Recovery Plan, the action may not be approved by NMFS because it opens up the risk of litigation. Tonseth noted NMFS did contribute to and review the content of the HGMPs.

III. Joint HCP-HCs and PRCC HSC

A. Collection Site for Chiwawa Spring Chinook Salmon Broodstock

Catherine Willard gave a presentation entitled, "*Chiwawa Brood Collection*" (Slide 1) showing a history of broodstock collection for the Chiwawa spring Chinook Hatchery Program and recent observations since the amended permit in 2014 with collection at the Chiwawa Weir. Willard said Mike Tonseth and Chris Moran (WDFW) assisted with gathering the data shown. Willard's presentation is included as Attachment D.

Slide 2: Historic brood collection summary table. Data shown included the collection locations, years in operation, and brood and smolt targets. Collection locations were combinations of Chiwawa Weir, Tumwater Dam, and Chiwawa River via snagging. The period 2008 to 2010 preceded recalculation. During recalculation, parties agreed to reduce broodstock collection to 298 (because permitted levels were not being met) and allow overwinter acclimation at Chiwawa. Thus, broodstock collections dropped in 2013 with recalculation.

Tonseth said 2013 was a proof of concept year for parentage-based tagging as an alternative brood stock collection method utilizing fish collected at the off-ladder adult fish trap (OLAFT) and assigning fish recaptured at Tumwater to a subbasin. Tonseth said there was no way to differentiate White River spring Chinook salmon effectively and this was not a successful approach.

Willard noted that from 2014 to present, the primary broodstock collection location is the Chiwawa Weir. Additionally, previously PIT-tagged natural-origin smolts originating from the Chiwawa River that are recaptured at Tumwater as adults are incorporated into the brood. Hatchery-origin fish are also collected at Tumwater Dam to backfill conservation program short-falls.

Slide 3: Brood origin summary table by year. Data summarized for the past 5 years include the number of NOR brood collected at the weir, number of HORs used to backfill, and the number of the NORs that were PIT-tagged as juveniles and were recaptured.

Slide 4: Summary table of Chiwawa Weir trapping days and bull trout encounters by year. Challenges to collecting NORs at the weir include low numbers of NORs captured and trapping limitations due to bull trout encounters. This has resulted in the need to backfill the Chiwawa Hatchery program with HORs, with a negative effect on proportion of natural-origin broodstock (pNOB) (and PNI). Annual limits to bull trout encounters are based on the average bull trout spawning population over the past 5 years. WDFW calculates bull trout population size from spawner surveys conducted in index reaches in the Chiwawa River basin.

Slide 5: Summary table of PNI by year. As runs have declined and bull trout encounters have increased, PNI has declined. Only in 2015 was a pNOB of 1 achieved.

Slide 6: Summary table of PNI by year, with PNI if pNOB had been 1.

Slide 7: Genetics. Summary of the microsatellite based genetic assignments of fish collected at the Chiwawa Weir by year. WDFW analyzed microsatellite genetic markers since 2014 (excluding 2018, which were being analyzed by CRITFC at the time for PBT). Assignments were made by using a 90% genetic assignment threshold for highly likely to assign to the Chiwawa basin and below 90% as positive but possibly ambiguous. The threshold for positive assignments is 60% or greater. Many fish in the subsample are unassigned because they assign to two different baseline populations.

Slide 8: Genetics. Summary of the genetic assignments compared between Chiwawa Weir and Tumwater Dam. Genetic analysis was done on fish at Tumwater Dam in order to exclude White River fish from being included in broodstock. Keely Murdoch noted that the genetic composition of spring Chinook salmon sampled at Tumwater Dam and at the Chiwawa Weir looks surprisingly similar, except for the percent of the trapped population that assign to the White River. Bill Gale said the difference may be an effect of numbers being trapped that are different between the two sites but agrees they are surprisingly similar. Murdoch also cautioned that there is a lot of uncertainty around the genetic assignments based on microsatellites. Kirk Truscott said it would be interesting to know if the precision of assignments was similar at Chiwawa Weir versus Tumwater Dam. Gale asked if the most likely identity of the unassigned fish are crosses between aggregate spawning groups (Nason-Chiwawa crosses, Chiwawa-White crosses, etc.). Willard, reading from the geneticist's report, stated that the majority of unassigned fish were likely Chiwawa-Wenatchee and Chiwawa-Nason crosses. Tonseth said samples are from broodstock that were collected for the Chiwawa program and do not necessarily reflect the run at large at Tumwater Dam.

Slide 9: Tradeoffs between collection sites. Willard summarized advantages and disadvantages of using Tumwater Dam compared to Chiwawa Weir for collecting broodstock. Willard said she is offering the details on both options because the program is currently not meeting PNI targets stated in the permit. Truscott asked whether the sliding scale is being used to meet PNI requirements.

Willard said yes, PNI goals are based on a sliding scale. Additionally, the permit states that in addition to the sliding scale, the mean PNI over five years is expected to be no less than of 0.67 and actions should be reevaluated if not meeting that target. Murdoch agreed and said that the PNI sliding scale tool may also require reevaluation with more years of data. Gale said regarding bull trout, spring Chinook salmon broodstock collection at Tumwater Dam affects primarily the Chiwaukum bull trout population, whereas collection at Chiwawa Weir affects the Chiwawa bull trout population. A disadvantage of using the Chiwawa Weir to capture spring Chinook salmon broodstock is the double handling of bull trout (i.e., bull trout captured at both Tumwater Dam and the Chiwawa Weir). Murdoch said those impacts of double handling could also be an impact on other native fish.

Tracy Hillman noted that a decision should be made prior to completion of the 2020 Broodstock Collection Protocols. Willard proposed adding a placeholder to the protocols and finishing the decision in the next meeting.

Tonseth said collecting broodstock at Tumwater Dam would be compositing the Chiwawa population, which has not been supported by the state. Reluctantly, WDFW moved in that direction with Nason Creek in order to implement that program. The genetic data do not tell where the parents of these fish spawned. Tonseth said the Relative Reproductive Success Study shows that offspring are highly likely to return to that tributary to spawn. Tonseth said the state is interested in allowing for local adaptation to continue. He said there is not a biological or abundance issue here; it is an operational issue. Tumwater Dam is able to accommodate the numbers required for the programs. Tonseth said constraints are currently in the hatchery programs' USFWS Biological Opinion (BiOp) regarding bull trout take at the Chiwawa Weir and there was negotiation over an action plan to be able to achieve broodstock for the Chiwawa program and minimize impacts to bull trout.⁴ Tonseth said at that time, concerns were expressed that the sideboards in the BiOp for the protection of bull trout may be too constraining. Gale said USFWS entered into that negotiation with the perspective that the collection plan would be affecting multiple populations of bull trout and although it was not ideal, they allowed the operations to go forward and parties moved toward the center on the negotiation. Tonseth said discussions should occur again before whole-heartedly abandoning the Chiwawa Weir and compositing the Chiwawa brood from Tumwater Dam. Gale said these populations have already been composited and the populations are not distinguishable anymore. Tonseth said there are differences in the individual fish depending on where the parents of that individual spawn. Tonseth said these differences are important to maintain for the most important spawning aggregates for recovery of the Wenatchee population. The compositing that occurred in the past was not directed in the same way. Murdoch said, based on the genetic data

⁴ United States Fish and Wildlife Service (USFWS) 2017. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion Consultation for the Wenatchee River Spring Chinook Salmon, Summer Chinook Salmon, and Steelhead Hatchery Programs. November 27, 2017.

collected, compositing is already happening at the Chiwawa Weir too. There is no way to know if fish collected at the Chiwawa Weir are from that river or are ducking into the river temporarily before moving to another tributary.

Willard said, out of 133 samples collected at the Chiwawa Weir (lacking data from 2018), 25% assigned with 95% or greater certainty to the Chiwawa River, 36% at 90% or greater, and 39% at less than 90% certainty. Truscott said he thought that would have been higher.

Murdoch said a decision before the committee is whether increasing PNI by collecting more NOR at Tumwater Dam is more important or whether it is more important to use fish that were trapped in the Chiwawa River.

Tonseth said when permits were approved to collect at the Chiwawa Weir, it was recognized that some fish from other spawning aggregates would be captured at the Chiwawa Weir. Tonseth questioned whether to run genetics on fish collected at the Chiwawa Weir or assume all fish collected at the Weir originated in the Chiwawa.

David Clark (WDFW) said the bull trout encounter threshold was met very early in the season in 2019, and it will be an ongoing problem constraining them to only trapping during the early part of the run.

Gale said, ideally, to allow the two spawning aggregates to separate, the current approach is not a good fit because it involves compositing for the Nason program, which will make the Nason program more similar to the Chiwawa, and then attempting to keep the Chiwawa aggregate separate from all other aggregates.

Truscott said the system is not set up that way. The original goal was not only to put more fish on spawning grounds in the Chiwawa River but to manage for local adaptation. Why not use the Chiwawa Weir to try to maintain local adaptation? Tonseth said in the past it was necessary to do adult management at Tumwater to reduce the stray rate of Chiwawa fish, but it seems to have been brought under control in recent years. It is unknown whether or not you could see the same effect by doing adult management at the Chiwawa Weir.

Peter Graf asked if fish are differentially marked depending on whether they are progeny of fish collected at Tumwater versus Chiwawa Weir. Graf said essentially there is a Tumwater composite that is going to the Chiwawa program, assuming that will continue if it is necessary in the future to continue backfilling the program. Matt Cooper asked if juvenile fish that are PIT-tagged in the Chiwawa River are genotyped and asked if they genotype back to the Chiwawa aggregate. Willard said juvenile fish are collected with electrofishing gear and PIT-tagged in the Chiwawa River, but they are not typically genotyped. Willard said one Chiwawa sample was accidentally genotyped due to a

mix up of samples and it was found to have a different genetic assignment: 64% Chiwawa with a mix of Nason, White, and Leavenworth markers. Graf noted that the composition appears really similar to the population composition at Tumwater and perhaps reflected compositing that had occurred historically.

Tonseth said, regardless of the genetic composition of the fish, if the parents of an individual spawned in the Chiwawa River, it is likely that fish will return to the Chiwawa River. Tonseth said trapping adults lower in the system takes the program farther away from maintaining local adaptation.

Willard said by using the Chiwawa Weir, PNI would not be met; although, total adult collection and smolt production targets have been met every year except for 2019.

Murdoch said retaining more NORs to achieve 100% NOR broodstock means a few more HORs would be spawning on the spawning ground, but natural-origin productivity would be increased due to the hatchery production. Murdoch said her preference would be to achieve the NOR broodstock goal (pNOB = 1) and allow more HORs onto the spawning grounds.

Tonseth said in 2018 and 2019, very few PIT-tagged NORs (PIT-tagged as juveniles) returned to Tumwater Dam and that trend is not likely to change due to poor ocean conditions, so the question of where to capture broodstock is now an operational problem.

Brett Farman said NMFS is in concurrence with WDFW to collect primarily at the Chiwawa Weir to maintain some level of local adaptation. Farman said acknowledging that compositing has taken place in the past is different than developing a management plan that directs compositing to occur in the future. Farman said he would like to work with the USFWS to define impacts differently. That is, encounters at the Chiwawa Weir do not necessarily constitute lethal take.

Tonseth said the permit allows for a maximum number of days operating the Chiwawa Weir and a cap on bull trout encounters. He added they have never reached the maximum number of days because they reach the bull trout cap before they reach the maximum allowed trapping days. Tonseth suggested discussing which limit is most appropriate.

Gale said if the HCP-HCs want to develop a proposal, Sierra Franks and Cindy Raekes (USFWS Ecological Services) can consider them in Consultation discussions. Gale said his answer is going to be that if the program is collecting the same fish from either location, why would we decide to increase the impacts on bull trout by collecting at both sites. Gale said they cannot be differentiated genetically. They have been mixed up completely in the past.

Truscott said if operating these programs to sustain local adaptation in the long term is not the goal, they need to rethink their direction completely.

Gale said it is not that the population in the Chiwawa has changed, it is that the Nason aggregate was made more like the Chiwawa. The Chiwawa fish were already locally adapted. Gale said what is needed is for the Nason aggregate to become locally adapted to Nason Creek, but that will not happen because they are being composited.

Truscott said using a higher genetic assignment rate than 60% would be better. Willard said they would use a genetic assignment rate of 90% or more.

Tonseth said he would not be satisfied because you could have a fish that assigned to the Chiwawa River, spawns in Nason Creek, so its offspring would return to Nason Creek, but if removed at Tumwater Dam it would not be allowed to return to Nason Creek.

Murdoch asked what level of micromanagement of spawning aggregates is necessary to maintain diversity when we are talking about three very similar tributaries and aggregates? Truscott said salmon have adapted to return to their native spawning ground and have site fidelity even within a reach. This is an adaptation that has allowed them to survive for thousands of years and should be sustained.

Gale said the Nason aggregate became like the Chiwawa aggregate when Chiwawa fish made up a large portion of the Nason broodstock composition over multiple brood years. Gale said programs should worry about local adaptation when there are abundances of fish that allow for management at the level of the spawning aggregate.

Hillman said if we have conversations with USFWS Ecological Services regarding increasing the number of bull trout that can be handled at the Chiwawa Weir, and hypothetically they allow the handling of up to 20 or 25% of the 5-year mean population size at the Chiwawa Weir, would all HCP-HC members agree to continue to use the weir for broodstock collection, or would this result in the handling of too many bull trout more than once?

Murdoch said their priority is to meet hatchery production goals primarily with NORs. Murdoch said she is interested in whether there are any data on unintended consequences of operating the Chiwawa Weir, such as fish straying as they encounter the weir. Hillman said there are observations on percent of brood that have strayed into other aggregates. For example, in 2010 to 2013 when the Chiwawa Weir was down, there was less straying. Hillman said the stray rate data suggest a correlation. Murdoch said it would be interesting to see the data by return year rather than by brood year.

Tonseth said there is currently a permit that spells out how fish will be collected to achieve brood for the program. A parallel path could explore the options for collection at different sites (e.g., use of one site only, collecting some component at Tumwater). Tonseth suggested following the program plan until there is a proposal to bring to the USFWS for consideration. Gale said depending on the proposal, there may be a range of reactions, for instance, ranging from describing in a letter how far programs would be deviating from the permits to reinitiating consultation. Tonseth said reinitiating consultation would not change the ongoing permitted operations. Gale reminded everyone that this BiOp was written for all Wenatchee programs. Tonseth said reinitiating consultation in the past (in 2014) moved the program under Section 10 of the Endangered Species Act and allowed WDFW to reconsult on a portion of the BiOp and not the entire BiOp. Gale said when the USFWS considered the Chiwawa Weir operation, the proposal was to operate 24 hours up and 24 hours down, which extended the overall trapping period. Gale said there are days that flows impact weir operations and suggested changing the criteria on operations.

Hillman asked if adult bull trout collected at the Chiwawa Weir are PIT-tagged. Willard said yes. Hillman said if fish are re-encountered and the data show high survival rates, the impact of the weir on bull trout could be better assessed. Chris Moran (WDFW) said there may not be enough redetections post-release to make an assessment. Hillman said if fish could be detected going upstream and again going downstream, you could say something about survival. Willard said, because trapping is only happening for up to 6 days, it is difficult to assign impact to the encounter with the weir and not with other impacts.

Hillman asked the HCP-HCs if the program is going forward with the existing protocols. Willard said something needs to change because they will still be limited by bull trout encounters, will still scramble to convene meetings with USFWS in-season, and will ultimately have to resort to collecting hatchery-by-hatchery brood at Tumwater Dam.

Gale said perhaps in this era of low returns, now is the time to reset approaches to collect all Chiwawa brood at Tumwater Dam, and then address how to improve on local adaptation in the future.

Tonseth suggested that he and Willard work together on a proposed approach to be recorded in the 2020 Broodstock Collection Protocols.

B. Broodstock Collection Protocols Progress Update

Tracy Hillman said the draft of the 2020 Broodstock Collection Protocols are not quite ready for internal review. Grant PUD has made their revisions but contributions from Douglas PUD and WDFW/Chelan PUD are still needed. The HCP-HCs and PRCC HSC have time to compile information and edit the protocols before the deadline of 10 days prior to the February meeting.

Mike Tonseth said the adult management section needs work in the main body of the Broodstock Collection Protocols for spring Chinook salmon. He is still waiting on ocean survival information.

Keely Murdoch will provide Appendix K on the YN's coho salmon program as soon as information is available.

Larissa Rohrbach will compile edits into one draft document and will distribute it no later than Friday, February 7, 2020, which is 10 days prior to the February meeting. Rohrbach will require edits by the end of January for compilation.

C. M&E Plan – Geneticist Guidance Attachment to the M&E Plan

Tracy Hillman reminded the committees that early in 2019 it was suggested that the written guidance provided by the panel of geneticists consulted in 2018 be appended to the PUD's M&E Plan (2019 Update). All members agreed to update the M&E Plan by appending the guidance from geneticists.

IV. Rock Island/Rocky Reach HCs

A. 2019 Chelan Falls Summer/Fall Chinook Broodstock Collection Summary

Catherine Willard gave a presentation entitled "2019 Chelan Falls Brood Collection Summary" (Slide 1). Willard's presentation is included as Attachment D.

Slide 2: Willard summarized activities in 2019. The weir was installed on July 11 with help from the CCT. For the pilot year, weir pieces and a trap box were borrowed from WDFW. The trap box turned out to be too small to trap at night (which would have required fish to be held at high densities longer than the biologists were comfortable with). Trapping occurred from July 17 to August 14. The trap was opened in the morning as early as possible and hours of operation were limited due to high temperatures and to avoid filling the trap to capacity. A WDFW Hydraulic Project Approval (HPA) permit was issued for the installation and operation of the weir. It was determined that a U.S. Army Corps of Engineers permit was not needed by using bags filled with gravel instead of sand bags, then opening the bags at the end of the activity to deposit the gravel as part of the ongoing gravel augmentation project in the Chelan River.

Slides 3 and 4: Lessons were learned in the pilot year. Willard said approximately 200 fish nosed up under the weir and escaped into the pool at the outlet of the water conveyance canal. Chinook salmon were removed from the pool by seine. Some summer Chinook carcasses were recovered from fish that died upstream of the weir. They resolved the challenge with the weir by zip-tying the pickets together. After the pickets were zip-tied, no more summer Chinook breached the weir. Willard said a bonus to operating the weir, was the added benefit of Northern pikeminnow removal, which is a tool within the HCP to achieve survival studies.

Slide 5: Willard made comparisons of hatchery spawning metrics between broodstock collected at Wells Hatchery and within the Chelan River. Willard said fecundity was similar and bacterial kidney disease (BKD) ELISA values were slightly higher in the Wells group. The number of fish collected were 380 from Wells Hatchery and 200 from the Chelan River. Willard said age structure information will be available in the future. Mike Tonseth said the hatchery staff were likely more selective collecting fish at Wells Hatchery because there were more fish available, whereas at Chelan Falls all fish were retained (no opportunity for selectivity). Tonseth said BKD ELISA levels in the Wells collected group were similar to Wenatchee summer Chinook salmon broodstock. He also said fish for the Chelan Falls program collected at Wells Hatchery were collected in the early part of the run over a short period (2 weeks) even though it was after the collection for Wells Fish Hatchery program and perhaps they had a larger body size at the earlier part of the run.

Slide 6: Redd counts in the Chelan River were actually higher than the past, despite trapping for broodstock and a large fishery. Redds occurred in the habitat pool upstream of the weir after trapping was complete.

Tonseth said in 2019 the primary collection location for the program was Wells Hatchery (for collecting 100% of brood) because it was unknown whether fish could be collected in the Chelan River and there were uncertainties about the effects of high water temperatures in the Chelan River on broodstock viability. Tonseth said the risk of disease appears to be low and it is unlikely that culling will need to occur. In addition, fecundity of fish collected in Chelan River appears normal. Tonseth said there still is some uncertainty about fry quality. Fish from broodstock collected at Wells Hatchery and from the Chelan River are incubated separately to be able determine if there are any differences in fry quality between the two sources of broodstock. Willard said they have not seen any difference in the past.

Tonseth proposed continuing the collection of summer/fall Chinook salmon for the Chelan Falls program at Wells Hatchery in 2020 because there remain uncertainties based on only 1 year of trapping in the Chelan River. Tonseth also suggested planning better for distributing surplus adults from collection at both sites, or to bring in fish trapped in the Wells Volunteer Trap later. Tonseth said there are parallel discussions on use of surplus fish for the Yakima River summer/fall Chinook salmon program and holding surplus adult fish at Eastbank Fish Hatchery. Tonseth said he would like to avoid producing too many surplus eggs that would ultimately be destroyed. Tonseth said he proposes that less than 100% of the broodstock target be collected at Wells Hatchery, for instance, 200 fish from Wells Hatchery, and they will develop a target for collection in the Chelan River to achieve the broodstock target. Tonseth said it is not anticipated that fewer adults will be available in 2020 than in 2019, but probably not more.

Willard said Chelan PUD will build a new trap box that will allow trapping at night if the HCP-HC supports the continuation of trapping in the Chelan River. Willard noted that the permit limits use of the weir to after July 1 and use of the weir is season-dependent; fish were not observed until mid-late July and flows limit use of the weir earlier in the season.

Kirk Truscott agreed that fish should be collected at Wells Hatchery for another year because making changes to the weir could have unintended effects, like the fish holding below the weir instead of passing through it into the holding box. Keely Murdoch said she supports collection in the Chelan River and at Wells Hatchery for one more year as long as production targets continue to be met.

HCP-HC members agreed there is no strong reason not to trap in the Chelan River versus at Wells Hatchery. Tonseth and Willard will add language to the Broodstock Collection Protocols for the HCs to review and approve proposing collection at Chelan River and Wells Hatchery to meet collection targets and minimize surplus adults and production of surplus eggs.

V. Administration

A. Next Meetings

The next HCP-HCs and PRCC HSC meetings will be February 19, 2020, March 18, 2020, and April 15, 2020, at Grant PUD in Wenatchee, Washington.

VI. List of Attachments

Attachment A List of Attendees

Attachment B Clarifying comments from Craig Busack (NMFS), January 21, 2020, regarding role in evaluating hatchery program actions versus Recovery Plan development

Attachment C Formal written responses from Craig Busack (NMFS) on White River Spring Chinook Salmon

Attachment D "Chiwawa Brood Collection" and "2019 Chelan Falls Brood Collection Summary"

Attachment A
Meeting Attendees

Name	Organization
Tracy Hillman	BioAnalysts, Inc.
Larissa Rohrbach	Anchor QEA, LLC
Ian Adams	Chelan PUD
Scott Hopkins	Chelan PUD
Catherine Willard*	Chelan PUD
Kirk Truscott*‡	Colville Confederated Tribes
Tom Kahler*	Douglas PUD
Greg Mackey*	Douglas PUD
Peter Graf‡	Grant PUD
Todd Pearsons‡	Grant PUD
Deanne Pavlik-Kunkel°	Grant PUD
Craig Busack°	National Marine Fisheries Service
Brett Farman*‡°	National Marine Fisheries Service
Matt Cooper*‡	U.S. Fish and Wildlife Service
Bill Gale*‡	U.S. Fish and Wildlife Service
Alf Haukenes	Washington Department of Fish and Wildlife
David Clark°	Washington Department of Fish and Wildlife
McLain Johnson°	Washington Department of Fish and Wildlife
Chris Moran°	Washington Department of Fish and Wildlife
Mike Tonseth*‡	Washington Department of Fish and Wildlife
Keely Murdoch*‡	Yakama Nation
Tom Scribner*‡°	Yakama Nation

Notes:

- * Denotes HCP-HC member or alternate
- ‡ Denotes PRCC HSC member or alternate
- ° Joined by phone

Attachment B
Clarifying comments from Craig Busack

From: Craig Busack - NOAA Federal <craig.busack@noaa.gov>
Sent: Tuesday, January 21, 2020 3:11 PM
To: Tracy Hillman <tracy.hillman@bioanalysts.net>
Subject: Message for committee members

Tracy, please send this out to the HC and HSC committee members. Thanks

Dear Committee Members:

I enjoyed talking with you last week, and hope I provided you with some useful perspectives. Unfortunately, I should have provided some context for my perspectives, especially as we got into broader areas of salmon recovery, but the importance of this did not occur to me until Tom Scribner mentioned reporting back to his YN superiors.

In thinking about my answers to your questions, it is important to remember that 99% of what Brett Farman and I do is evaluating actions (hatchery programs and inland fisheries) in terms of NEPA, Magnuson-Stevens, and the ESA from a technical/scientific perspective. We may be asked our opinions or even participate on teams working on policy issues such as listings, viability criteria development, or recovery planning, but that is outside our ordinary purview and range of authority. On issues related to recovery planning and recovery, the appropriate path for discussion is through Scott Carlon, NOAA's rep on the coordinating committees, then his boss Dale Bambrick, Columbia Basin Branch Chief, then Dale's boss Michael Tehan, Assistant Regional Administrator, Interior Columbia Basin Office.

Craig

Craig Busack, Ph.D.

*Anadromous Production and Inland Fisheries Program
Sustainable Fisheries Division
NOAA Fisheries
West Coast Regional Office
1201 NE Lloyd Blvd., Suite 1100
Portland, OR 97232
503-230-5412*

Questions for Craig Busack:

Craig Busack

January 27, 2020

Here are responses to the questions that were posed to me at the 1/15 committee meeting. These answers will undoubtedly differ somewhat from what I said at the meeting, as per the email message I sent to the committee last week. Long story short, I can offer opinions/perspectives on all these, but decision-making authority on many lies within the Interior Columbia Branch Office (ICBO), the local head of which is Dale Bambrick, not with the Sustainable Fisheries Division, of which Brett and I are members.

1. Is the White River spawning aggregate necessary to the Wenatchee spring Chinook population in regards to meeting VSP criteria? ***This has been discussed many times within the agency, including Mike Ford and Tom Cooney. The short answer is no, but it will help achieve the 4 of 5 spawning aggregate goal.***
2. What is the NOAA Science Center's most recent view on the importance of the White River spawning aggregate? ***I contacted Mike Ford for the most recent information. He said his most recent information was Chiwawa-White $F_{st}=.0049$, Chiwawa-Nason $F_{st}=.0025$, and wild-hatchery in that area $F_{st}=.0025$. So White is more different than the general baseline level of F_{st} , but these are very small F_{st} levels. To the extent that the distinctiveness of White River is due to adaptation to the environment it occupies, this distinctiveness could be regained if it were to be lost.***

I'd like to also point out that the genetic distinctiveness (or lack thereof) of the White River spring Chinook spawning aggregate has been discussed many times within the PRCC HSC, including at least one panel discussion by geneticists from CRITFC, NOAA, and WDFW. I recommend the committee refer to the records of these past discussions in the minutes

3. If the White River and Little Wenatchee spawning aggregates are important to recovery and both suffer from the same limiting factors, how will NOAA address recovery without one or both aggregates? ***I'm not going to answer this directly because the ensuing discussion focused more on the issue of the Wenatchee River spawning aggregate not really existing. If this were the case, the current spatial distribution specs in the recovery plan now seem more onerous (i.e., is it now that all 4 real spawning aggregates are needed?) How to deal with this, including the possibility of a revision to the recovery plan, is something you should take up with Dale.***
4. How important is the White River aggregate to the overall genetic diversity of Wenatchee spring Chinook?
 - a. How much within-population genetic variation is needed for recovery? I know of no set quantitative standards for diversity for any ESU or DPS. ***My experience in recovery discussions, including assessing population VSP levels is that everything has to be evaluated in the context of everything else (i.e. it is relational, not absolute). However, this question is more appropriate for Dale, assisted by NWFSC geneticists.***
 - b. Given the degree of escapement by other within basin aggregates into the White River, is there evidence to suggest that the White River aggregate is still genetically distinct?

Attachment C

Formal written responses from Craig Busack (NMFS) on White River Spring Chinook Salmon

See answers to earlier questions (particularly question #2) above also refer back to minutes from previous discussions.

5. If the White River genetic signature is lost, can recovery still be achieved? *As I said earlier, recent discussions at NOAA have concluded yes.*
 - a. If so, how do we achieve recovery without the White River genetic signature? *Again, this is technically outside my lane, so again, it would be wise to contact Dale. However, I also recommend looking at the recovery plan. I have not studied it in detail, but there is lack of emphasis on White River specifically.*
6. Would NOAA support a composite broodstock hatchery program for the White River? *Depends on the details of that program, but at this point it is not clear what the benefits would be. While it can be argued that a larger spawning population is a good thing in that it reduces genetic drift, allowing natural selection to be more efficient, compositing would likely erase the White River genetic signature. It also seems that given the low production potential of the White River basin, the value of the program is open to question.*
7. If White River spring Chinook are not genetically distinct from other Wenatchee spring Chinook aggregates, what would be NOAA's view on White River supplementation? *Same as #6, but genetic concerns would be less. The White River spawning aggregate is distinct; the question is how high a value to place on this low level of distinctness.*
8. If HORs do not contribute to NORs, would adding another supplementation program in the Wenatchee contribute to recovery? *Maybe, maybe not. Key to recovery is sustainability of natural production, not how many NORs you can create by augmenting spawning grounds with hatchery fish. Exactly how the hatchery programs contribute to recovery is a question best asked of the ICBO. We would expect to be in on that discussion, but in a supporting role.*

In the ensuing discussion, it became clear that a larger issue is the general recovery benefits of supplementation programs, other than as a buffer against extinction. My own opinion is that supplementation programs only really solve problems when populations are critically low; you can't permanently get more natural production out of a system without increasing the productivity and capacity of that system.

Attachment D
“Chiwawa Brood Collection” and “2019 Chelan Falls Brood Collection Summary”

Chiwawa Brood Collection

January 15th, 2020 HC

History

Brood Years	Location	Brood Target	Smolt Target
1989-1991	Chiwawa River via snagging	380	672,000
1992-2007	Chiwawa Weir (NO) and Tumwater (HO)	380 (both HO and NO) ¹	672,000
2008-2010	Chiwawa Weir (NO) and Tumwater (HO)	178 (both HO and NO) ¹	298,000
2011	Chiwawa Weir	178 (both HO and NO) ¹	298,000
2012	Chiwawa Weir	114 (both HO and NO) ²	204,452
2013	Tumwater	74 ³	144,026
2014-2019	Chiwawa Weir	78 ^{4,5}	144,026

¹Up to 33% of the estimated NO return but no less than 33% NO fish in broodstock. Broodstock collection did not occur for the 1995 and 1999 broods.

²Includes NNI recalculated Chiwawa obligation of 144,026 + 60,516 Methow SPC obligation under a one-time agreement.

³ NO adults collected at Tumwater Dam as proof of concept year for PBT. HO adults collected at Tumwater as backup.

⁴ HO adults collected at Tumwater + NO adults previously PIT tagged as juveniles in the Chiwawa River collected at Tumwater Dam + NO adults collected at Chiwawa Weir.

⁵ In 2019, NO fish collected at Tumwater for the Nason program were balanced accordingly with only those adults assigning to the Chiwawa with a probability >95% being used for the Chiwawa program.

Brood Origin Summary

Brood Year	Broodstock		Previously PIT-tagged as smolts (recaps)
	NOB (brood target= up to 78)	HOB	
2014	61	12	15
2015	72	0	21
2016	62	37	16
2017	50	18	20
2018	37	69	6
2019	28 ¹	32	7

¹Of the 28 natural-origin brood, 7 were collected at the Chiwawa weir, 7 were recaps, and 14 were collected at Tumwater and retained for the Chiwawa brood based on genetic assignment to the Chiwawa at 95% or greater.

Trap Days/Bull Trout Encounters

Year	Dates Operated	Trapping Days	Bull Trout Encounters	NOB Collected at the Weir	Recaps
2014	6/26 to 8/15	21	56	46	15
2015	6/10 to 7/24	15	67	51	21
2016	6/22 to 7/22	15	101	46	16
2017	7/11 to 7/31	12	56	30	20
2018	6/27 to 7/7	6	99	31	6
2019	6/14 to 7/3	6	119	7 ¹	7

¹Of the 28 natural-origin brood, 7 were collected at the Chiwawa weir, 7 were recaps, and 14 were collected at Tumwater and retained for the Chiwawa brood based on genetic assignment to the Chiwawa at 95% or greater.

PNI

Brood Year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
2014	538	461	0.61	61	12	0.84	0.65
2015	337	630	0.69	72	0	1.00	0.61
2016	407	164	0.46	62	37	0.63	0.70
2017	171	288	0.65	50	18	0.74	0.55
2018	166	456	0.73	37	69	0.35	0.34
2019	TBD	TBD	TBD	28	32	0.47	TBD

PNI

Brood Year	Spawners			Broodstock			PNI	PNI with pNOB = 1.0
	NOS	HOS	pHOS	NOB	HOB	pNOB		
2014	538	461	0.61	61	12	0.84	0.65	0.69
2015	337	630	0.69	72	0	1.00	0.61	0.61
2016	407	164	0.46	62	37	0.63	0.70	0.78
2017	171	288	0.65	50	18	0.74	0.55	0.62
2018	166	456	0.73	37	69	0.35	0.34	0.59
2019	TBD	TBD	TBD	28	32	0.47	TBD	NA

Genetics

Table1. Summary of Chiwawa broodstock population assignments to Spring Chinook salmon baseline. Unassigned fish were nearly equally likely to have come from two or more populations.

year	WDFW code	Assignments at >60% relative likelihood					unassign	Grand Total
		Chiwawa	Entiat	Nason	WenatcheeSpr	White		
2014	14RL	19		3	1	1	2	26
2015	15IM	24		6	2	2	13	47
2016	16IN	15	1	2	4	2	4	28
2017	17GI	15		3	1		6	25
2019	19IA	6			1			7
	Grand Total	79	1	14	9	5	25	133

We set 90% as a threshold for highly likely assignments and considered values below that as positive but possibly ambiguous assignments. We report the assignments above 60% as positive assignments and below 60% the fish were considered unassigned (Small et al.).

Genetics

Population Assignment	Weir (BY 14-17 and 19)	TUM (BY 15-19)
Chiwawa	64.69%	67.25%
Nason	8.69%	7.80%
Wenatchee Spring Chinook	8.13%	2.32%
White	3.05%	7.43%
Entiat	0.71%	1.51%
Unassigned	14.73%	9.57%
Leavenworth	0.0%	2.16%
Summer Chinook	0.0%	1.53%

Genetic Samples (n)	
400	Total samples analyzed between BY15-19 at TUM
269 (67.25%)	Assigned to Chiwawa at 60% or greater
173 (43.25%)	Assigned to Chiwawa at 90% or greater
146 (36.50%)	Assigned to Chiwawa at 95% or greater

Trade-offs

	Advantages	Disadvantages
Tumwater	<ul style="list-style-type: none">• More likely to collect NO brood and meet PNI goals• Fish not handled twice (TUM and Chiwawa Weir)• Select broodstock based on genetic assignment	<ul style="list-style-type: none">• Collected brood held at EB for genetic analyses
Chiwawa Weir	<ul style="list-style-type: none">• Local adaptation	<ul style="list-style-type: none">• Bull trout encounters• Potential delay spring Chinook and bull trout

2019 Chelan Falls Brood Collection Summary

January 15th, 2020 HC

2019 Chelan River Weir

- Permitting
- Operation
 - Installed July 11th
 - Trapped July 17th to August 14th



2019 Chelan River Weir



2019 Chelan River Weir

● Trapping summary

- 184 brood seined
- 29 trapped
- 13 Chinook carcasses
- 766 pikeminnow

2019 Chelan River Weir

● Hatchery Spawn Summary

Collection Location	Fecundity	% Loss	ELISA		
			Low	Mod	High
Chelan River	3,947	6.86	0	0	0
Wells	4,426	6.45	10	6	19

2019 Chelan River Weir

● Chelan River Summer Chinook Surveys

Survey Year	Total Redd Count
2015	448
2016	448
2017	421
2018	420
2019	509